

I claim:

1. An inspection method utilizing vertical slicing imaging, comprising the steps of:
  - 5 acquiring data corresponding to a number of horizontal slice images, extending through an object of interest;
  - defining a vertical region of interest from the data; and
  - constructing a vertical slice image based upon data falling within the vertical region of interest.

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2. An inspection method as claimed in claim 1, wherein the step of defining the vertical region of interest comprises locating a best horizontal slice image passing through the region of interest.
- 15 3. An inspection method as claimed in claim 2, wherein the step of constructing the vertical slice image comprises synthesizing the vertical slice image from horizontal slice images above and below the best horizontal slice image.
- 20 4. An inspection method as claimed in claim 2, wherein the step of locating the best horizontal slice image comprises computing, for at least two horizontal slice images, an amount of solder within each of the at least two horizontal slice images.
- 25 5. An inspection method as claimed in claim 4, wherein the step of locating the best horizontal slice image further comprises reviewing a distribution of the computed amounts of solder.
- 30 6. An inspection method as claimed in claim 2, wherein the step of locating the best horizontal slice image comprises identifying one or more anchor devices in the horizontal slice images.

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7. An inspection method as claimed in claim 1, wherein the step of defining the vertical region of interest comprises locating a best vertical slice image.

8. An inspection method as claimed in claim 7, wherein locating the best vertical slice image comprises computing, for at least two vertical slice images, an amount of solder within each of the at least two vertical slice images.

9. An inspection method as claimed in claim 8, wherein the step of locating the best vertical slice image further comprises reviewing a distribution of the computed amounts of solder.

10. An inspection method as claimed in claim 1, wherein the step of acquiring data comprises:  
15 applying penetrating radiation to the object of interest; and  
detecting radiation passing through the object of interest.

11. An inspection method utilizing vertical slice imaging comprising the steps of:  
acquiring data corresponding to a number of horizontal slice images extending through an object of interest;  
20 defining a vertical region of interest from the data;  
constructing a vertical slice image based upon data falling within the vertical region of interest; and  
analyzing the vertical slice image to determine whether a defect is present.

25 12. An inspection method as claimed in claim 11, wherein analyzing the vertical slice image comprises determining whether a BGA joint is lifted.

13. An inspection method as claimed in claim 12, wherein determining whether the BGA joint is lifted comprises:  
30 determining a measure of a height of the BGA joint; and

comparing the height to a threshold.

14. An inspection method as claimed in claim 12, wherein determining whether the BGA joint is lifted comprises:

5 calculating a midpoint for a plurality of adjacent BGA joints; and  
comparing at least two of the calculated midpoints to each other.

10 15. An inspection method as claimed in claim 11, wherein analyzing the vertical slice image comprises determining whether a solder fillet is properly formed.

16. An inspection method as claimed in claim 11, wherein analyzing the vertical slice image comprises determining whether a void is present.

17. An inspection method as claimed in claim 16, further comprising the step of determining a size of the void when the void is present.

18. An inspection method as claimed in claim 11, wherein analyzing the vertical slice image comprises determining whether a device is tilted.

20 25. An inspection method as claimed in claim 11, wherein analyzing the vertical slice image comprises detecting whether a bridge is present.

20. An inspection method as claimed in claim 11, wherein analyzing the vertical slice image comprises detecting whether an insufficient amount of solder is present.